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NorthPoint

Northpoint Communications

September 30, 1999

BY HAND

Magalie Roman Salas, Secretary
Federal Communications Commission
445 Twelfth Street, SW -- Room TW-A325
Washington, D.C. 20554

Re: Written Ex Parte Submission, CC Docket No. 98-147

Dear Ms. Salas:

Several competitive local exchange carriers (LECs) that offer digital subscriber line (DSL) services respectfully submit the attached Statement of Dr. Dennis J. Austin, which addresses operations support system (OSS) issues relating to line sharing. The competitive DSL providers submitting this statement are: Bluestar Communications, Inc., Covad Communications Company, HarvardNet, Inc., Network Access Solutions Corp., NorthPoint Communications, Inc., and Rhythms NetConnections, Inc.

In the course of the Advanced Wireline Services proceeding, the incumbent local exchange carriers have repeatedly declined to put specific information in the record about the likely costs and the timing of any changes to OSS that may needed in order to implement two-carrier line sharing. The burden of demonstrating any alleged costs or implementation delays attributable to OSS modifications should be on the incumbent LECs. In the interest of expediting the Commission's decision-making on this issue, however, the competitive DSL carriers submit the attached statement, which contains specific information about the changes to OSS that are necessary for line sharing, and concludes that the changes required are largely modest, and, in any event, there are interim arrangements that can be implemented immediately, pending the completion of the modification to the incumbent LECs' OSS.

In addition, we have reviewed the September 23, 1999 written ex parte presentation of SBC Telecommunications, Inc., which includes as an attachment a "white paper" prepared by Telcordia describing a proposed OSS solution. The Telcordia white paper, like the other submissions by incumbent LECs, is very general, with few specific details about the nature of the incremental functionality needed to meet line sharing needs over and above the functionality that either already exists in the current OSS, or must be developed to meet other needs of incumbent LECs. As described in detail in the statement, we believe that line sharing OSS can be accommodated through modest enhancements, and we do not understand SBC's written ex parte to contradict this conclusion.

The competitive DSL carriers are concerned, however, that the Telcordia "solution" appears to have been developed on the basis of erroneous assumptions. For example, the Telcordia attachment (page 4) depicts two configurations (Figures 1 and 2) for the provision of line sharing by an incumbent LEC that apparently were specified by SBC. Those configurations, however, are not consistent with the way in which, in the view of the competitive DSL carriers,

line sharing should be provided. For instance, in Figures 1 and 2 (titled "Loop Sharing -- Central Office Network Configuration," and "Line Sharing Remote Network Configuration," respectively), Telcordia depicts a configuration whereby the data side of the split loop is dedicated to a collocated CLEC DSLAM, rather than returned to the MDF as proposed previously by NorthPoint and other CLECs. See NorthPoint Comments, CC Docket No. 98-147, June 15, 1999, Attachment No. 2 (enclosed). In the Telcordia configuration, the splitter would be prewired to serve *only* the CLEC equipment to which it is dedicated, whereas in NorthPoint's proposal the splitter would be a device capable of serving all carriers in a central office, including the incumbent LEC, from a single rack. This reduces space requirements, provisioning intervals, and cost and ensures against discrimination.

In Figure 2, Telcordia shows a splitter and DSLAM located outside of the central office and adjacent to a remote terminal. There is no reason why CLECs serving end users who are in turn served through remote terminals would adopt this configuration. Rather, the shared line would be brought back to the central office and split in accordance with the configuration described by NorthPoint and other DSL competitive carriers.

Other shortcomings in the Telcordia submission are addressed within the attached statement.

Please contact me if you have questions about this letter or the attached statement.

In accordance with Section 1.1206(b)(1) of the Commission's rules, 47 C.F.R. §1.1206(b)(1), an original and a copy of this letter and the enclosures are being provided to you for inclusion in the public record of the above-referenced proceeding.

Sincerely,

Michael E. Olsen
Deputy General Counsel

Enclosures

cc: Lawrence Strickling
Jane Jackson
Carol Mattey
Margaret Egler
Don Stockdale
Staci Pies
Vincent Paladini
Howard Shelanski
Pat DeGraba

Before the

FEDERAL COMMUNICATIONS COMMISSION

Washington, DC 20554

In the Matter of	)	
Deployment of Wireline Services	)	
Offering Advanced Telecommunications	)	**CC Docket No. 98-147**
Capability	)	

Statement of Dr. Dennis J. Austin

September 30, 1999

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This statement is in response to the filings of incumbent local exchange carriers (ILECs) in the Commission's Notice of Proposed Rulemaking (NPRM) and Further Notice of Proposed Rulemaking (FNPRM) in CC Docket No. 98-147. This statement is based on work conducted by a team of consultants from Maxim Telecom Consulting Group (MTG) funded by six competitive local exchange carriers (CLECs) including NorthPoint Communications, Covad Communications, HarvardNet, Inc., Network Access Solutions Corp., Rhythms NetConnections, and Bluestar Communications, Inc.

Purpose

The purpose of this evaluation is to render our independent opinion of the issues and concerns raised by ILECs regarding the effect that the implementation of Line Sharing would have on their operations support systems (OSSs).

Approach

We found the ILEC filings regarding OSS functional requirements for Line Sharing to be fairly high-level in nature with few specific details about the nature of the incremental functionality needed to meet Line Sharing needs over and above that already existing in the current OSSs or being developed to support the ILECs' other needs. In order to remedy this lack of specificity and create a consistent baseline, our team developed a set of assumptions for use in determining the functionality that must exist for other needs. Examples include the ILECs' own Line Sharing services and their obligations under the Telecommunications Act of 1996, applicable FCC rulings and court proceedings. These assumptions coupled with the team's experience with ILEC and CLEC service offerings, business processes and OSS acquisition and implementation served as the basis for our evaluation.

Key Findings

1. ILEC OSS changes required to incrementally support Line Sharing with a CLEC are minimal in nature rather than massive and all encompassing as some ILECs have portrayed them. Most of the OSS functional requirements that were identified pre-date Line Sharing and are required for the ILECs' own ADSL offerings, their obligation to provide UNEs or other requirements such as actions they are taking to support merger plans and/or 271 applications. See Table 1 on page 7 for further detail.

2. In the case of Bell Atlantic, it appears that the company has already ordered and received from Telcordia, in the May to June 1999 timeframe, upgrades to the LFACS OSS that allow it to inventory, assign and track a voice service and up to four other services on one loop. This apparently was done to support its own tariffed ADSL services but has the functionality that several ILECs identified as a requirement for CLEC-ILEC Line Sharing.

3. In several cases, the ILECs appear to have overlooked, or intentionally omitted, the exploration of modest changes and/or extensions of current approaches and OSS functionality. Instead, they have tried to justify entirely new OSS development efforts as massive in nature and driven solely by Line Sharing (such as BellSouth's proposed new SDM-based inventory system). We disagree.

4. The timeframe to prepare ILEC OSSs to handle CLEC-ILEC Line Sharing has been estimated at one year by Sprint[1], 1.5 to 2 years by SBC[2], 2 years by Ameritech (after industry standards were agreed to)[3] and 3 to 5 years by BellSouth[4]. Since the functionality is largely existing, it is our opinion that work-arounds could be in place immediately with 2 to 4 weeks required for ILEC staff training. The few minor incremental upgrades, primarily for ordering, could be formally completed over the next 3 to 12 months. This timeline is substantiated by Bell Atlantic in its 271 filings in Massachusetts and Ameritech/SBC in their merger filings to the FCC.

5. The cost estimates submitted by ILECs for making OSS upgrades to support CLEC-ILEC Line Sharing ranged from GTE's "$5 million"[5] to SBC's "hundreds of millions and more"[6]. Most of the functionality already exists and is used today for digital added main line (DAML), universal digital carrier (UDC), and asymmetric digital subscriber line (ADSL). Based on this and more details provided in the body of this document, we are confident that the cost for incremental Line Sharing upgrades will be much closer to and certainly no more than GTE's estimate of $5 million nationally rather than SBC's estimate of "hundreds of millions and more". That is just plain excessive with no substantiation.

6. Based on review of the white paper entitled *Telcordia's Proposed OSS Solution for SBC Line-Sharing Needs* contained in the recent SBC/Telcordia Ex Parte filing[7], the Telcordia solution appears to merely be a more "elegant" version of our work-around approach. The biggest difference is that our approach can be implemented immediately while they claim that their approach will take 15 months. The planned enhancements sound similar in nature to the work that Telcordia did for Bell Atlantic's upgrades for its own line sharing services. It appears that SBC needs this type of upgrade for its own requirements and the enhancements are complementary to our recommended work-arounds. The Telcordia/SBC filing in no meaningful way alters our findings and recommendations.

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[1] Sprint 7/22/99 filing at p. ii

[2] SBC 6/15/99 filing at p. 21

[3] Ameritech 6/15/99 filing at p. 8-9

[4] BellSouth 7/22/99 filing at p. 26 footnote 57

[5] GTE 6/15/99 filing at pp. 28-29

[6] SBC 6/15/99 filing at p. 21

[7] Lincoln E. Brown letter to Magalie Roman Salas regarding CC Docket No. 98-147, 9/23/99

Conclusion

The broad sweeping issues raised by the ILECs and the lack of specificity about what new functionality they need combined with our understanding of their current OSS capabilities, lead us to the conclusion that many issues raised and remedies suggested are grossly overstated.

Table 1 - Summary of Findings

Concern	Proposed Approach	Work-Around Effort/Timeline	Formalization Effort/Timeline
1. No way to order shared loop	Assign codes (which does not involve OBF), use new paper form and manual fax procedures established for UNEs until OBF standardizes across ILECs. Then update GUI, EDI and fully implement.	Incremental rather than major new development. 1 to 2 weeks to modify forms and/or develop manual procedures	Present to OBF; Update Web GUI in 3 months; Update EDI standard in 6 months; Fully implement EDI is less than 12 months
2. No way to provision two services on one loop	Train employees on applicability of existing ADSL inventory and assignment capabilities Line Sharing; assign new equipment codes if required, using existing process	Immediate implementation with 1 to 2 weeks to train staff on use of existing process for CLEC-ILEC Line Sharing	Nothing Required
3. No way to track two addresses, customers and service providers on one loop	Address is same. Customer and service provider can be tracked and cross-referenced.	Immediately available by building on Work-Arounds in #1 and #2 above so requires 2 to 4 weeks cumulatively.	Small – may need to add field to house CLEC ID and new ID; driven by ILEC needs
4. No way to notify both CLEC and POTS customer of problem on loop	Approaches detailed for issues 1, 2, 3 will support tracking customer info for reference	Immediate Work-Around available from activities 1 through 3 – so within 2 to 4 weeks cumulatively for ILEC training.	See 1,2, and 3 above
5. No way to perform routine automated testing without disrupting other service	Notify customer of possible service disruption during testing; Provide physical testing access once splitter in place that is usable by CLEC OSS in one of ways suggested	Immediate Work-Around since customer can be notified at time of shared sale.	OSS effort is low, process and procedures effort is medium once splitter available.
6. Shared loops will create twice the number of trouble tickets	May be fewer tickets so not clear if ILEC supposition is true. If so, existing ILEC OSS have ability to correlate duplicate related trouble tickets.	Nothing required	Little or no OSS impact
7. Shared loops will present repair and maintenance problems	New scenarios are similar to elements of other existing scenarios. Collaboratively revise existing processes and procedures.	Immediate collaborative revision as soon as logistics permit, no pre-requisites	Primarily a process and procedure issue, not an OSS functionality issue
8. No way to bill both customers on one loop	Establish POTS customer with TN, CLEC customer with Ckt ID and cross-reference. May require new USOCs, codes, use of existing logic.	Immediate Work-Around with 3 to 4 weeks to assign new codes if required	Primarily uses existing capabilities, may vary by ILEC – but definitely minor not total re-do

I. Introduction

A. Purpose

In this statement, we respond to the filings of incumbent local exchange carriers (ILECs) in the Commission's Notice of Proposed Rulemaking (NPRM) and Further Notice of Proposed Rulemaking (FNPRM) in CC 98-147. This statement is based on work conducted by a team of consultants from Maxim Telecom Consulting Group (MTG) funded by six competitive local exchange carriers (CLECs) including NorthPoint Communications, Covad Communications, HarvardNet, Inc., Network Access Solutions Corp., Rhythms NetConnections, and Bluestar Communications, Inc.

The purpose of this evaluation was to render our independent opinion of the issues and concerns raised by ILECs regarding the effect that the implementation of Line Sharing would have on their operations support systems (OSSs). There is considerable debate on how to best define Line Sharing as well as on the impacts of its implementation. For purposes of this document, Line Sharing occurs on a loop when the ILEC provides requesting carriers with access to the transmission frequencies above those used by the ILEC to provide plain old telephone service (POTS) analog voice service on a line. NorthPoint[8] has proposed that "The Commission should require that incumbent LECs permit competitive LECs to share lines based on the configuration in the ANSI T1.413 ADSL standard..." and our evaluation used asymmetric digital subscriber line (ADSL) as the context for Line Sharing. However, the analysis and its findings are not exclusive to ADSL and generally apply to xDSL in the future.

B. Scope

The focus of this statement is on the OSSs used by the ILECs to support services that could be offered by a CLEC on a line shared with an ILEC that is offering POTS on the lower frequencies. We sometimes refer to this as CLEC-ILEC Line Sharing when necessary to make a distinction from other line sharing that is occurring today between different business units in an ILEC. ILEC-ILEC Line Sharing occurs when one business unit offers POTS on the lower frequencies and another provides ADSL on the upper frequencies. Where necessary, technical and business processes were also addressed in the context of the OSS issue.

C. Approach

We identified OSS related issues in the ILEC filings, grouped what appeared to be similar issues stated differently in separate filings and crystallized those groupings down to eight functional challenges. We then examined the anatomy of each of the eight to establish its nature and validity and, where appropriate, identified alternative approaches to addressing those challenges. Where appropriate, we evaluated the level of effort required to implement the alternative.

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[8] NorthPoint 6/15/99 filing at p. 16

D. Qualifications

This evaluation is based on MTG's knowledge of and experience with ILEC and CLEC service offerings, business processes and the acquisition and implementation of OSSs acquired over more than twenty years in the telecommunications industry. I am currently a Vice President with MTG focussing on our network and OSS practice for converging technologies. My previous work experience includes 11 years with Bell Labs and executive positions at Dataspeed, Inc., Sprint, and San Francisco Consulting Group (SFCG), now a subsidiary of KPMG Peat Marwick LLP. My education includes a Ph.D. in electrical engineering from Stanford University. Throughout my career, I have specialized in the planning and implementation of telecommunications network infrastructure and systems, as well as market research and competitive assessment. This has included leading several teams providing telecommunications' expert services to clients in both regulatory and legal proceedings. A copy of my resume is provided as Appendix 1.

The other evaluation team members are experienced MTG professional consultants. MTG provides management consulting services to the telecommunications industry with focus on three complementary areas – Business Strategy, Networks and Information Systems including OSS. Appendix 2 provides a more detailed statement of MTG's qualifications including resumes of team members.

II. Background

A. OSS Evolution

Operations Support Systems (OSSs) are automated processes used by telecommunications service providers to order and provision services, manage network infrastructure and customer services and bill their customers. Beginning in 1984 with both AT&T's divestiture of its Regional Bell Operating Companies (RBOCs) and other subsidiaries, and equal access, the functional requirements for these OSSs have undergone a significant broadening to accommodate the more competitive service provider environment as well as more diverse and competitive OSS and Network Element supplier environments. Portions of AT&T's other divested entities became Bellcore, a service organization designed to meet the OSS development and support needs of the newly divested RBOCs. Bellcore, later sold by the RBOCs to SAIC and now known as Telcordia Technologies, Inc., still provides OSS development and maintenance services for many of the legacy OSSs used by today's ILECs. In addition, Telcordia develops new systems in its MediaVantage series to replace the legacy systems.

Divestiture and the subsequent equal access implementation led to many new OSS functional requirements to address the fact that two separate entities would be providing the local exchange services and long distance, or inter-exchange, services on a customer's line. This impacted ordering, service provisioning, inventory, assignment, trouble management, customer care and billing functionality. For example, billing systems were enhanced to support the billing of multiple service providers' services on a single customer bill. In addition, systems were developed to improve the efficiency of information exchange between the ILEC and inter-exchange carriers (IXCs).

Also in the 1980s, new service providers, known as competitive access providers (CAPs), began providing local exchange services in competition with the ILECs. Initially, the focus of the emerging CAPs was on special services over dedicated facilities using a combination of their own facilities and facilities leased from other carriers including the ILECs. Many CAPs expanded into local switched services offering dial tone service using their own switches or switching capacity leased from another service provider. The ILEC OSSs and business processes such as local telephone number administration were enhanced to support this new category of competitive local exchange service provider (CLEC). More recently, data CLECs have emerged which specialize in high-speed data services and Internet access.

Between 1986 and 1993, interim and then long-term 800 Number Portability was implemented, followed by Local Number Portability beginning in 1994. These processes were implemented in the industry to encourage competition, lay groundwork for the development of advanced telecommunication services and provide customers with additional choices for their telecommunications needs. The emergence of Intra-LATA competition has added another category of service provider, the Intra-LATA long distance provider, to the local and long distance entities, making, potentially, three service providers for one line. To support this new category of competition, the OSSs were further enhanced to maintain local pre-subscribed Intra-LATA codes (LPICs) identifying the various service providers, provide appropriate billing and customer service, and other improvements.

Very recently, the introduction of unbundled network elements (UNEs) as a method for CLECs to order service components from ILECs has further broadened the functional capabilities of ILEC OSSs and the CLEC-ILEC mechanized business process interfaces.

Currently, several of the ILECs are seeking approval to enter the long distance market as permitted under Section 271 of the Telecommunications Act. As a prerequisite for winning approval of their 271 applications, the ILECs must modify their OSSs to allow their competitors to have non-discriminatory access to their OSSs' functionality. A number of the ILECs have had their OSSs modified to support this "open access" requirement and have demonstrated or are in the process of demonstrating these new capabilities to various state commissions and independent third party testers. Progress has been made in this area and is ongoing.

During this evolutionary process covering the last 15 years, many modifications have been made to the original "legacy" type OSSs that have enhanced their functionality to support new technologies, new products/services and the increasingly competitive nature of the industry.

In parallel with these industry structural changes, the ILECs have significantly expanded the number and type of product and services they offer to their customers in order to remain competitive in the marketplace. Many of these new products and services have necessitated the introduction of new OSSs and changes to the ILEC's legacy OSSs in order for the ILECs to efficiently support the introduction, deployment, maintenance and billing of these new products/services. Competition has often led the ILECs to not only introduce new services to new markets, but also to deploy new OSSs that supported these new services in a way that was more efficient and responsive to customer requirements than they were able to do previously.

In fact, as we look back on the major blocks of functionality added to those original OSSs, it appears that they are much more flexible than many of us in the industry ever imagined that they could be. And that is not an accident. With each major change, the service providers, vendors and industry associations have expanded system functionality and flexibility rather than restricted it. These recently delivered capabilities should permit the OSSs to support Line Sharing without significant modification.

B. Current ILEC OSSs

Each ILEC carries out pre-ordering, ordering, service provisioning, billing, and repair and maintenance functions for all of its current products and services using a set of OSSs that vary somewhat from company to company but share a common baseline functionality across all ILECs. These same OSSs are involved in supporting their existing ILEC-ILEC Line Sharing as well as CLEC-ILEC Line Sharing being considered in this proceeding. Other ILEC functions such as retail sales, network provisioning and management occur in parallel. See Appendix 3 for an overview of typical ILEC OSSs in use currently.

The exchange of information between the CLECs and ILECs required to support their existing trading relationship for Resale and UNE related functions are accomplished through one or more of the following communications vehicles:

- Electronic Exchange of Data (EDI) Gateways are used by ILECs to receive orders electronically from CLECs on an application-to-application basis

- Web GUIs are used by ILECs for receipt of CLEC orders individually input by CLEC staff
- Paper faxes are also used for receipt of CLEC orders which are then input to ILEC OSSs by ILEC staff
- Eventually, other interface approaches such as CORBA-based systems will be added as communications vehicles

C. Debate Surrounding OSS Change

It has been our experience over the last 20 years in the telecommunications industry that there has frequently been debate between the new competitor and the incumbent over OSS changes needed to support divestiture and deregulation. These debates usually have focussed on whether changes to an OSS are required or if a work-around using existing OSS capability can be devised. If an OSS change is required, the discussion shifts to the magnitude of the change that is necessary to satisfy the new competitor or regulator's specific requirements, how much it will cost, who will pay and what is the timeline. If a work-around can be devised, the implementation can be achieved virtually immediately.

III. OSS Change in the Context of Line Sharing

A. Line Sharing Context

The ILECs have raised several OSS issues they say are directly related to Line Sharing. MTG has evaluated these issues in this context and rendered its opinion and rationale for that opinion. Each of these issues is addressed in Section IV. In virtually every instance an immediate work around is available to address the issues raised with 2 to 4 weeks required for implementation and training of ILEC staff. In the few instances requiring a more permanent solution, such as ordering, formalization should take less than 12 months.

B. Other ILEC Requirements for OSS Functionality

OSS requirements associated with the implementation of Line Sharing cannot be properly evaluated in isolation from other ILEC requirements for similar, and in many cases, identical functionality. Three major areas that have driven OSS functional requirements are the ILECs' own advanced services offerings, including ADSL; their obligations to provide unbundled network elements (UNEs) to other service providers and their initiatives to meet OSS-related 271 prerequisites for entry into long distance.

ILECs offering ADSL and other advanced services must be able to pre-qualify, order, provision, bill and assure service quality on loops shared by their own voice and ADSL services. In situations where ILECs provide ADSL or other advanced services to their voice customers over a shared loop, through either their own subsidiaries at arm's length (ILEC-ILEC Line Sharing) or in cooperation with unaffiliated Internet Service Providers (ISPs), many of the same functional requirements exist as do in a CLEC-ILEC shared line scenario. Examples include the capabilities to identify and track two services on one loop and to identify and track two service providers on one loop. Arm's length subsidiaries are by definition another service provider.

The Telecommunications Act of 1996 requires that ILECs provide UNEs to CLECs. ILECs, CLECs and industry associations have devoted considerable resources to establish ordering, provisioning, billing and service assurance processes and procedures. These processes and procedures are well documented and are available on ILEC Web sites for reference by their CLEC customers.[9]

In addition, both ILECs and some CLECs have developed and/or enhanced their electronic business process interfaces and "behind the gateway" OSSs to support flow-through provisioning and workforce management for UNE ordering and provisioning. Flow-through provisioning refers to the processing of orders without manual intervention using OSS to perform the provisioning functions automatically. Flow-through provisioning is a goal of both CLECs and ILECs because it offers significant efficiencies and cost savings to both parties.

It is important to consider past accomplishments in changing and improving OSS. First, these changes prove that substantial change can be effectively accomplished, and second, and most important, the functionality provided by these changes provide much of the functionality that will

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[9] See Bell Atlantic's *CLEC Handbook* series and U S West's *Interconnect and Resale Resource Guide* for typical examples.

be required to make line-sharing an effective reality. In their filings, the ILECs raise a number of issues that appear to ignore this large body of past effort and the resulting increased OSS functionality.

C. OSS Functionality Assumptions

We found the ILEC filings regarding OSS functional requirements for Line Sharing to be fairly high-level in nature with few specific details about the nature of the incremental functionality needed to meet Line Sharing needs over and above other needs. In order to remedy this lack of specificity and create a consistent baseline, our team developed a set of assumptions for use in determining the functionality that must exist for other needs, such as their own ILEC-ILEC Line Sharing or UNE obligations. This assisted in identification of the extent to which CLEC-ILEC Line Sharing requires specific new functionality. These assumptions are:

1. If the ILEC needs a specific functionality for its own advanced services deployment and support, that functionality already exists and is not driven by the CLEC-ILEC Line Sharing requirement.

2. If the ILEC needs a specific functionality to support its UNE offerings, that functionality already exists and is not driven by the CLEC-ILEC Line Sharing requirement.

3. In evaluating what new specific functionality is needed, the focus is only on the gap between requirements that already exist and those associated with CLEC-ILEC Line Sharing.

IV. MTG Findings and Proposed Alternative Approaches

A. OSS Concerns Raised By ILECs Regarding Line Sharing

MTG reviewed the comments and reply comments filed with the FCC in the matters of Deployment of Wireline Services Offering Advanced Telecommunications Capability (CC Docket No. 98-147) by Ameritech[10], Bell Atlantic[11], BellSouth[12], GTE[13], SBC[14], Sprint[15] and U S West[16].

Many of the concerns raised by the ILECs were discussed in general terms with only limited specifics made available to assist the FCC and the public in fully understanding the scope and severity of the concern. In order to evaluate the concerns raised in a meaningful and coherent way, we found it necessary to summarize concerns and link to business functions and OSS that support those functions today. The result of this process is summarized in Appendix 4.

B. MTG Analysis of Specific Concerns Raised and Proposed Alternatives

The following section describes each of the OSS concerns raised by the ILECs as problematic with implementing Line Sharing and demonstrates that there are quick and economic solutions to address such concerns.

ILEC Concern 1: Ordering the Transmission Frequencies Above the Voice Band

A. Sample ILEC Concern (s)

U S West[17] indicates that it "would have to undertake significant development work to implement a new ordering process for an "unbundled" data channel. CLECs have insisted (with encouragement of regulators) on standardized ordering forms, prompting incumbent LECs to rely on the Order and Billing Forum ("OBF") to develop uniform documents. Before incumbent LECs could take orders for unbundled data frequencies, OBF would have to create a new ordering standard..."

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[10] Ameritech Reply 10/16/98 and Comments 6/15/99

[11] Bell Atlantic Comments 6/15/99 and Reply 7/22/99

[12] BellSouth Comments 6/15/99 and Reply 7/22/99

[13] GTE Comments 6/15/99 and Reply 7/22/99

[14] SBC Comments 6/15/99 , Reply 7/22/99 and 98-141 ex parte filing 7/1/99

[15] Sprint Comments 6/15/99 and Reply 7/22/99

[16] U S West Comments 6/15/99 and Reply 7/22/99

[17] U S West 7/22/99 filing at p. 26

B. Analysis of Underlying Issue

The underlying issue appears to be that the ILECs need a standard ordering form and process for shared loops before orders can be taken. Although the OBF has been instrumental in moving the industry toward national standards, unique ILEC interfaces, systems and processes remain a reality and appear to be with us for the next two to three years, at least. ILECs already develop and deploy new products and services that CLECs order with and without OBF involvement.

In addition, ILECs develop products and services that wholesale and retail customers order from them. These new services, including U S West's current ADSL offering that shares a line with voice, were implemented using current system capabilities without the need to "undertake significant development work" such as a new standardized ordering form. According to a recent trade press article, U S West[18] is adding 500 new ADSL subscribers every day and its total ADSL customer base represents 40% of the DSL lines in the U. S. today. Clearly, at those volumes and with that embedded base of customers, capabilities exist within U S West to process these ILEC-ILEC Line Sharing orders. Due to the strong analogy between ILEC-ILEC and CLEC-ILEC Line Sharing, much of the existing capability could be used to support the latter and could eventually be included in OBF standards; however, that is not a prerequisite to CLECs and ILECs conducting business.

C. Existing Solution to Concern

The framework to handle CLEC ordering of shared lines from ILECs exists today in the Unbundled Network Element (UNE) ordering processes and procedures. For example, U S West's own *Interconnect & Resale Resource Guide* (IRRG) lays out the existing standardized UNE ordering procedures in significant detail, which can be used for DSL Line Sharing. Types of detail provided include product and service descriptions; business rules for forms, formats and fields for manual and electronic interfaces; Universal Service Order Codes (USOCs); references for Network Channel (NC) and Network Channel Interface (NCI) Codes and other ordering information. The USOCs provided include one for 2-wire non-loaded loops suitable for a CLEC to use for DSL (U23).

As an additional example, Bell Atlantic's *CLEC Handbook* (Section 2.3.5.1) provides the Universal Service Order Codes (USOCs) for ordering ADSL Compatible Unbundled Loops (UY2XX, UY2X+, UJ2X+) and a unique Class of Service for ADSL used in Bell Atlantic North (XQLV9) along with detailed descriptions of each.

These procedures are used today by CLECs to place orders using the CLEC-ILEC electronic EDI or the web GUI interface and to place orders manually using faxed paper forms. These procedures could easily be extended for Line Sharing. To address Line Sharing, additional USOCs, Classes of Service, and other codes could be readily assigned to identify Shared CLEC ADSL Compatible Unbundled Loops. These new codes and the current process for ordering UNEs could be used as the standard ordering process for shared loops by using the new codes to identify the shared line service on the existing form and/or format.

A key objective of the ordering function, over and above the installation of a service, is to establish the records needed to assure service and bill the customer once service is installed.

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[18] America's Network 8/18/99, Web article only at www.americasnetwork.com/news/9908to9912/19990824015318.htm

Issues related to identifying the CLEC circuit and the voice telephone number on a shared line for downstream inventory, trouble management and billing functions could also be handled in the existing framework. The ILECs currently track their own combined voice and ADSL offerings using a telephone number to identify the voice service and a circuit number to identify the ADSL service[19]. This capability could be extended to track similar services on other loops shared with CLECs. A CLEC Shared ADSL loop can be identified with a circuit number and cross-referenced to the POTS telephone number (TN). This cross-reference might be achieved in one of several ways during the ordering and provisioning process. Options include embedding the TN in the ILEC assigned circuit number (ECCKT); embedding it in the customer assigned circuit number (CKR); adding it as a cross-reference in the existing Account Number (AN), Account Telephone Number (ATN), or Remarks fields or by creating a new field and field identifier (FID).

Another approach would be to create two internal ILEC orders from the one Line Sharing order submitted using UNE processes. One order could be used to establish the CLEC service on the upper frequencies of the shared line and the other would be a record-type order to add line sharing indicators to the analog voice customer's account and other records. These two orders could be related to each other at initiation and tracked to completion as related orders. This approach is similar to that used for routine "From" and "To" orders when a customer moves location but keeps the same number. It also is similar to that used when an ILEC's analog voice customer decides to change service provider and the CLEC submits an order for the change. The ILEC then uses that order to both establish the service for the CLEC as the new customer and remove the service for the voice customer.

D. Ease of Implementing Solution

The level of effort to establish a standard ordering process is incremental in nature rather than a major new development effort. The ILECs accommodate orders for their own advanced services such as ADSL on shared lines with voice service using existing systems. Assignment of new USOCs, Classes of Service, and other codes is a routine process that does not involve the OBF. These processes are utilized every time an ILEC begins offering a new product or service that requires differentiation and should not be unduly burdensome. Examples include the new suite of privacy services that U S West recently introduced. These include Caller ID with Privacy+ and No Solicitation[20].

Incremental changes to how existing fields on the UNE order form/electronic order formats may appropriately involve the OBF for coordination of a standard approach across ILECs and communication of the standard using established procedures to inform all interested parties. The OBF has a history of success in responding to needs of the industry by resolving many issues in a collaborative process such as its work associated with Local Number Portability.

An incremental modification to the standard ordering process of this nature could be accomplished in a few months as described below. In the interim, between when Line Sharing becomes effective and the electronic standard has been modified, orders for shared lines could be processed by the ILECs using their manual procedures and faxed paper forms already established for UNE ordering. A manual order solution could be developed in an expedient collaborative in

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[19] Affidavit of Mark D. Schmidt on behalf of U S West in FCC 98-188 dated 9/24/98 at paragraph 12

[20] See http://www.uswest.com

1 to 2 weeks to facilitate immediate ordering. Modifications could be formalized at the next OBF, and then the web GUIs could be updated in 3 months, the EDI standards updated in 6 months and EDI fully implemented in less than 12 months. The newer CORBA interfaces could be updated as available. This timeline may vary depending on the option(s) selected but manual procedures could be used in the interim adding incentive to move expeditiously.

ILEC Concern 2: Inventorying and Assigning Two Services On the Same Loop

A. Sample ILEC Concern (s)

BellSouth[21] indicates that its "current systems cannot identify for a single copper pair its different bands of spectrum and associate them with different services and different providers....In order for the spectrum to be inventoried so that it could be assigned to specific services and multiple carriers, each copper pair would have to be established as a carrier system. The POTS spectrum then would be provisioned as a telephone number-identified ("TN-Identified") circuit and the advanced services spectrum (or other xDSL spectrum divisions/services) would be provisioned as a special service circuit. This will require a massive rebuilding of BellSouth's loop inventory system....an entirely new operations support system ("OSS"), based on spectrum division multiplexing (''SDM"), would have to be created....The specifics for the new OSS, such as cost, development time, interfaces to existing OSSs, impacts on existing work centers, cannot be identified until the standards for such an OSS have been developed."

B. Analysis of Underlying Issue

The underlying issue appears to be that the ILECs need to inventory totally new types of information about shared loops that are not required for loops that are not shared with a competitive service provider. The ILECs claim that this new type of information is an incremental requirement to satisfy the needs of line sharing so that assignments for both the POTS voice service and the ADSL service can be made and tracked for service provisioning, maintenance and billing purposes.

The requirement associated with Line Sharing in the ADSL context is to identify two services on the same loop. Identification and tracking of two services on one loop does not require redesign of inventory systems to distinguish bands of spectrum, *per se*. If it did, it would be done today by the ILECs to process their own ADSL orders and would not be an incremental requirement for Line Sharing.

The more relevant requirement is to identify two logical paths (derived channels) and their associated services similarly to how digitally added main lines (DAMLs), universal digital carriers (UDCs) and the ILECs' own ADSL services are widely accommodated in existing OSSs today. The baseline functionality already exists and does not require "massive rebuilding of BellSouth's loop inventory system".

BellSouth appears to have overlooked this option of using current capabilities in existing OSSs (and expanding if necessary) in favor of an entirely new OSS that cannot, according to BellSouth's comments, even be designed, developed or costed at this time.

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[21] Filing of 6/15/99 at p. 21

C. Proposed Immediate Work-Around to Concern

The primary system currently used by the ILECs to inventory loops is the Loop Facility Assignment and Control System (LFACS) component of the Facility and Assignment and Control System (FACS). LFACS performs inventory and assignment of individual cable and pair loops, DAMLs, UDCs, Integrated Services Digital Network (ISDN), and ADSL lines. These all involve inventorying multiple services on a single loop and represent strong analogies to Line Sharing. For example, as LFACs inventories UDCs, it keeps the type of data shown in Table 2.

ADSL services provided by ILECs over lines shared with voice service are inventoried and assigned in a similar fashion with the type of information shown in Table 3.

Table 2 -Type of Existing Information for UDC

Address	Cable Name	Physical Cable & Pair	Derived Channel 1	Derived Channel 2
10 Elm St	25	105	1105	1106
	UDC	CKT NNNN	TN 206-555-3535	TN 206-555-4755
			1FR[22]	1 FR

Table 3 - Type of Existing Information for ILEC ADSL

Address	Cable Name	Pair	Derived Channel 1	Derived Channel 2
10 Elm St	25	105	1105	1106
		CKT MMMM	TN 206-555-3535	Ckt No 657772
			1 FR	ADSL

The ILECs can easily use these existing capabilities to inventory services on a shared line. This may require the assignment of additional codes similar to those used with UDC and ADSL to uniquely identify in LFACS that the loop is shared with a CLEC and to create the logical record holders for assignment and inventory purposes similar to those in Tables 2 and 3. Once the CLEC shared line type is in inventory and assignable, the information can be accessed by or sent to other OSSs such as SOAC, NSDB, SWITCH, etc. just as it is today with ILEC UDC and ADSL records. In addition, LFACS can be queried directly by address, telephone number or cable and pair to support on-going maintenance and repair activities. When queried by address, all services working to that address will be identified, including the services sharing the loop.

The Trunk Inventory Record Keeping System (TIRKS) is a second OSS used today by ILECs to inventory and assign their ADSL services offerings and special services. The equipment needed to support the ADSL, such as digital subscriber line access multiplexers (DSLAMs), are inventoried in TIRKS and cross-referenced to the LFACS loop inventory by the circuit number as shown in the above Table 3. Equipment is identified in TIRKS with an equipment catalog item (ECI) and its characteristics are maintained in the catalog.

In Line Sharing, the DSLAM will likely be owned by the CLEC and physically located in the CLEC's co-location space in the ILEC's end office. New equipment codes may be required to

[22] Flat Rate Residence Line

indicate that the DSLAM is of a generic type compatible with ADSL standards and owned by a CLEC rather than the specific types and descriptions inventoried for ILEC-owned DSLAMs. This would allow the ILEC to know that a CLEC-owned DSLAM is connected to the line for reference during maintenance and troubleshooting activities.

Today, CLECs with co-location arrangements are assigned terminations on the ILEC's Main Distribution Frame (MDF) to terminate the tie cables running to their DSLAMs within the co-location space. ILECs inventory and assign MDF locations in an OSS such as SWITCH. When a CLEC orders a new UNE loop, it specifies the MDF termination on which the ILEC should deliver the UNE loop.

Two approaches are used by ILECs in cabling splitters connected to loops. The first approach is to cable the high frequency band directly to the DSLAM and the second is to cable it to another MDF location and then on to the DSLAM. The second approach has several administrative advantages, including facilitating easy customer moves and changes as well as facilitating changes in one or more of the customer's service providers and services.

In the second situation, the splitter has three MDF appearances – one to terminate the loop, one to terminate the voice band out of the splitter and one to terminate the high band out of the splitter. These MDF locations can be tracked today in ILEC OSS such as COSMOS and SWITCH and could be used to further cross-reference CLEC-owned DSLAM equipment to splitters in COSMOS, SWITCH and/or TIRKS.

D. Ease of Implementing Work-Around

The capabilities already exist in LFACS to inventory and assign two services on one loop. Some minimal effort may be required to assign new codes to properly describe the shared line discretely from other similar services and create the logical record holders for the two services. In addition, the ILECs may need to update documentation on the proper use of the codes and train employees on the applicability of the existing processes, used by ILECs for their own ADSL inventory and assignment, to shared line orders from CLECs. This level of effort is minimal compared to the development of a new Spectrum Division Multiplexing (SDM)-based loop inventory system such as that suggested by BellSouth. To the extent that a generic CLEC-owned DSLAM will be inventoried in TIRKS, new equipment codes may also need to be established. This, again, is fairly routine and represents minimal effort.

In addition, we understand that Bell Atlantic has already ordered and received from Telcordia a further upgrade to LFACS that increases the inventory and tracking capabilities to accommodate a POTS voice service and up to four additional services on one loop. This LFACS release was provided to Bell Atlantic in May 1999 and is currently running on release 2 of the upgraded software, according to Telcordia. Related changes to SOAC, NSDB, and SWITCH were delivered in the same timeframe with changes for NCON provided in June 1999. The Bell Atlantic LFACS upgrades also served as the foundation for a proposal from Telcordia to U S West for a similar set of upgrades to support xDSL requirements.

We conclude that the driver for these upgrades are Bell Atlantic's, and the other ILECs', needs to support their own ADSL offerings, both those offered directly to retail customers and their wholesale offerings to ISP partners. Although not driven by Line Sharing, the upgrades appear to further mitigate the issue of inventorying and assigning multiple services to one loop.

E. Longer Term Solution

Given the existence of an immediate work around, there appears to be no need to hold up Line Sharing while a permanent solution is implemented. Nevertheless, in the longer term, BellSouth and other ILECs may decide to develop an entirely new SDM-based OSS to accommodate their many inventory needs associated with their current and new product and service offerings. Examples of items they may need to address include Asynchronous Transfer Mode (ATM) and Internet protocol (IP)-based network elements and other yet-to-be-defined needs. A new system will not only need to track telephone numbers and circuit numbers, but also IP addresses and other customer information. However, this need for a new system is not driven by Line Sharing requirements which can be met through assigning new codes or data elements in existing systems using current capabilities.

ILEC Concern 3: Tracking Two Service Addresses, Two Customers or Two Service Providers for the Same Loop

A. Sample ILEC Concern (s)

Ameritech[23] states that "Another major impact of line sharing on the ILEC operations is presented by the simple fact that today's local loop facilities are engineered, provisioned, assigned, maintained on an integrated basis, for use and management by a single entity in the provisioning of voice services. The OSS infrastructure used to perform these functions clearly was not designed or equipped to manage the use by two carriers of a single facility, much less multiple-carrier use of small portions of a loop's total bandwidth..."

U S West[24] indicates that "Incumbents' operational support systems are not equipped to accommodate multiple users of a loop. U S West inventories loops as whole elements, rather than according to the spectrum or services they support. Line sharing thus would require U S West to undertake the expense of making substantial changes to its ordering, installation, maintenance and billing systems, as described below..."

Bell Atlantic[25] said, "ILEC operations support systems (OSSs) do not have the capability to store information regarding the use of the loop by multiple carriers."

BellSouth[26] stated its "current systems cannot identify for a single copper pair its different bands of spectrum and associate them with different services and different providers."

Sprint[27] stated "the dispatch system for maintenance personnel assumes only one subscriber address ..."

SBC[28] indicated " There are no systems in place that permit multi-carrier physical use of the same local exchange line, and systems will have to be upgraded to handle two network providers

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[23] Ameritech 6/15/99 filing at p. 11

[24] U S West 7/22/99 filing at p. 25

[25] Bell Atlantic 6/15/99 filing at III B 14

[26] BellSouth 6/15/99 filing at p. 21

[27] Sprint 6/15/99 filing at p. 11

simultaneously using the same local exchange line. Existing Operations Support Systems ("OSSs") do not have the inventory, provisioning, maintenance, etc. capability of handling two providers on a single local loop. While the Trunk Integrated Records Keeping System ("TIRKS") has the capability of maintaining inventory and assignment records for multiple facilities on a single service, it does not currently have the capability to inventory and assign multiple services on a single local loop. TIRKS receives the local loop information, availability, and assignment information from the Loop Facilities Assignment and Control System ("LFACS") – the primary loop inventory system – which does not have the capability to inventory and assign multiple services or service addresses on a single local loop."

B. Analysis of the Underlying Issue

The issue regarding multiple service addresses is irrelevant to the ADSL Line Sharing discussion because under the FCC's definition of Line Sharing[29], over a single line means to the same address. In all cases foreseeable in this context, CLECs will be providing ADSL service to a voice customer at the same address as the voice service, just as ILECs do today with their own ILEC-ILEC ADSL Line Sharing.

The issue regarding the assignment of multiple services to one loop does not appear to be a valid issue as discussed in the previous analysis of Concern 2. The ILECs are today inventorying and assigning multiple services to one loop for a variety of services including their own ADSL, ISDN, DAML services as well as in cases where UDCs are deployed. It appears that at least one ILEC, specifically Bell Atlantic, already has the ability to track up to four services in addition to voice on one loop.

The issue surrounding the ability to associate two service providers with one loop already exists in several functional areas. Today, ILECs associate multiple service providers with one loop for a variety of reasons including identification of intra-LATA and inter-LATA long distance carriers[30], and the identification of wholesale ISP partners that offer ADSL over the same loop that the ILEC offers voice. The long distance carriers for a line are tracked in many systems from ordering through to billing and an association is maintained in the end office switch for routing purposes. Ameritech has petitioned the FCC to begin offering its ADSL and other advanced services through a separate business unit, Ameritech Advanced Data Services, under Section 706 requirements which it is reasonable to expect is tracked at some level of detail. According to the comments of Bell Atlantic and SBC, the ILECs track their ISP partners as resale customers with the ILEC being the sole service provider "using" the loop.

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[28] SBC 6/15/99 filing at p. 20

[29] FCC 98-147 First Report and Order FNPR (rel. 3/31/99) paragraph 99. "...incumbent LECs must provide requesting carriers with access to the transmission frequencies above that used for analog voice service on any lines that LECs use to provide exchange service when the LEC itself provides both exchange and advanced services over a single line..."

[30] Affidavit of Stuart Miller on behalf of Bell Atlantic-Massachusetts to the Department of Telecommunications and Energy at page 9 "Customer Service Record (CSR) – the CSR contains the end user's account information with BA-MA, including listed name and address, billing name and address, billing and working telephone numbers for the account, a list of all services provided to the end user, and the end user's Pre-subscribed Interexchange Carrier (PIC) and Local Pre-subscribed Interexchange Carrier (LPIC)..."

The remedies proposed by the ILECs to enable tracking of multiple service providers on the same loop are high-level with few details as to the nature of the solutions i.e. "substantial changes" stated by U S West or "upgraded to handle" stated by SBC in paragraph A above.

C. Proposed Immediate Work Around to Concern

The incremental difference between what ILECs currently do to track multiple service providers associated with their own ADSL services, and what would be required to track multiple service providers in a Line Sharing scenario, centers around the need to identify associated equipment, such as a DSLAM, as CLEC-owned rather than ILEC-owned.

LFACS has the ability to inventory and assign up to 2 multiple services (and newer versions up to 5) on one loop, as discussed under Concern 2. TIRKS, used by most ILECs to inventory and assign their own ADSL services, receives its loop inventory and assignment information from LFACS as discussed by SBC above. Since the main difference between CLEC-ILEC line sharing and ILEC-ILEC line sharing is which service provider owns the equipment, that equipment ownership could be used to identify the added service provider in CLEC-ILEC ADSL Line Sharing.

The ILECs could assign one or more new equipment codes for a generic CLEC-owned DSLAM that complies with the ADSL standard. The association of these codes with a loop in LFACS and/or TIRKS would indicate a multiple service provider condition with equipment ownership. To specifically identify the CLEC, if necessary, there are two options. The first is for the ILEC to assign separate new codes for each CLEC participating in Line Sharing using existing processes for the establishment of a new type of DSLAM. The second would be to use a generic DSLAM equipment code in conjunction with a CLEC code. The ILECs currently use standard codes such as PICs and LPICs to identify CLECs for various purposes. One of these codes could be used or a new one could be assigned.

D. Ease of Implementing Work-Around

Although most elements of the proposed solution are merely using current LFACS and/or TIRKS OSS capabilities, there may be a requirement to add an additional field to house the CLEC code if it is not feasible to use existing fields. It is reasonable to expect that the level of effort associated with that activity would be low. The associated cost is difficult to estimate without additional details of the specific work required from the ILECs and Telcordia.

However, it may be useful to look at the costs for another type of change and draw some corollaries. For example, a recently completed change to LFACS to accommodate High-Bit-Rate Digital Subscriber Line Service on 2-wires versus the previous norm of 4-wires was publicly priced at $400,000 + or – 30%[31], resulting in a worst case of $520,000. Even assuming that the change needed for the CLEC service provider field (if a new field is required) is 2 or 3 times higher, the resulting cost is $1 to $1.5 million. In orders of magnitude, these numbers, even when added to the cost of other incremental changes, appear to be significantly lower than SBC's estimate of "hundreds of millions"[32]. It just does not seem to add up and indicates that SBC's estimate is excessive.

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[31] http://www.telcordia.com/resources/genericreq/digest/requests/matros.html

[32] SBC 6/15/99 filing at p. 21

The level of effort required to implement the ability to track multiple service providers on one loop is small. However, the main driver for this requirement comes not from Line Sharing but from the ILECs' own need to be able to identify their own business units, separate arm's-length advanced service provider subsidiaries or ISP partners/customers.

In short, they need to do this for themselves for other reasons.

ILEC Concern 4: Tracking and Notifying Both the CLEC and POTS Customer During Maintenance and Repair

A. Sample ILEC Concern (s)

Sprint[33] says, " modifications to trouble reporting and billing systems will need to reflect the fact that more than one carrier is using the same loop."

B. Analysis of the Underlying Issue

The underlying issue appears to be that the ILEC needs to track both CLEC and voice customer information for a shared line in order to contact one or both as required for trouble management, repair and maintenance. Knowing about both customers on one loop will likely facilitate troubleshooting and repair processes.

C. Proposed Immediate Work-Arounds

The approaches proposed to address ordering shared loops (Concern 1), provisioning two services on the same loop (Concern 2) and tracking two service providers using the shared loop (Concern 3) should result in the ILEC's customer information on its CLEC customer being available as required to support repair and maintenance functions. Concern 1 can be addressed by extending existing UNE ordering processes to Line Sharing with minor form modifications. Concern 2 can be addressed by applying existing capabilities used for DAML, UDC and ILEC DSL in conjunction with additional code assignments, where necessary. Concern 3 can be addressed by using existing capabilities, assigning new equipment codes and perhaps adding a new field to existing systems. Work-arounds for these remedies are relatively minor in nature and can be done immediately with 2 to 4 weeks required for implementation and ILEC staff training. Modifications, primarily required for ordering, could be formalized at the next OBF, and then the web GUIs could be updated in 3 months, the EDI standards updated in 6 months and EDI fully implemented in less than 12 months. The newer CORBA interfaces could be updated as available. For further details, see the specific concerns previously discussed.

ILEC Concern 5: Performing Routine Automated Testing and On-demand Testing

A. Sample ILEC Concern (s)

Ameritech[34] states "...performing a simple, routine loop-back test on a shared loop could unavoidably disrupt service to other carrier's customers using that loop."

An expert witness for Bell Atlantic[35] indicates "the test equipment for [Bell Atlantic's] copper loop ADSL systems is partially integrated with [Bell Atlantic's] ADSL DSLAMs. Testing of the

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[33] Sprint 6/15/99 filing at p. 11

[34] Ameritech 6/15/99 filing at p. 11

DSL portion, when provided by a party other than the party providing other services over that same loop[,] could not be done with Bell Atlantic's current test equipment."

GTE[36] states that "...in a unbundled spectrum environment neither carrier will have the ability to isolate or remotely test their services."

Sprint[37] states that "...current automated test systems cannot perform POTS testing in line sharing applications."

U S West[38] indicates that " ...routine metallic loop tests, which require disabling ADSL service, could not be accomplished where the *CLEC's* DSLAM powers the data service."

B. Analysis of Underlying Issue

If there is an area that most industry camps seem to agree on, this is it. There is uniform acceptance that testing the metallic loop for one service on a shared line with traditional test systems will, by necessity, disrupt the other service temporarily. The potential for impact to other services on the loop is highest during installation, maintenance and repair activities. This is true in ILEC-ILEC shared line situations as well. The real issue to be addressed in the context of Line Sharing is how non-discriminatory testing access will be provided to both service providers, and their related OSSs, in a CLEC-ILEC shared line scenario.

Description of Existing Testing Process

Today, ILECs generally perform automated metallic loop tests on the lower frequencies of the loops from the end office using access to the line provided through the voice switch. These tests are done as required to support installation, repair and maintenance processes. CLECs generally perform similar automated metallic loop tests on the lower frequencies of UNE loops they order today for non-shared xDSL services. These tests are made to help ascertain if the ILEC has delivered the loop on the firm order commitment (FOC) date and to rule out any immediately obvious problems on the line such as the presence of load coils, excessive noise, bad splices, unacceptable loop length, or unacceptable bridge taps. The CLEC accesses the line at test points near their DSLAM usually located in its co-location space at the end office. CLECs also make similar tests during repair and maintenance of their UNE loops.

Co-operative testing already is done by the ILEC and CLEC technicians, for acceptance purposes, when the ILEC technician is at the customer premise installing the UNE line to the demarcation point. These co-operative tests are to further assure that the UNE loop meets typical voice standards and usually include a test that shorts the tip and ring to take advantage of the technician's presence at the premise to make a far end test.

Typically, little or no disruptive testing is routinely done by the ILEC on shared lines on the upper frequencies due to limitations and/or availability of current testing equipment/systems. Performance of the loop in the upper frequency band is tested during troubleshooting and repair.

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[35] Bell Atlantic 6/15/99 filing at II-B-12, Statement of Dr. Charles L. Jackson

[36] GTE 7/22/99 filing at p. 27

[37] Sprint 6/15/99 filing at p. 11

[38] U S West 7/22/99 filing at p 27 [emphasis in original]

This holds true, as well, in situations where the ILEC is providing both voice and ADSL services on one loop. They also typically run metallic loop tests in the lower frequency band and often rely on changing cable and pair assignments when problems are encountered on the upper frequency band.

C. Proposed Work-Around to Concern (s)

There are two parts to the metallic loop testing issue in a CLEC-ILEC Line Sharing environment. The first, and easier, part deals with customers knowing that a loop test on one of their services will impact their other service. The need to educate the customer on this fact can easily be handled during the customer care process. For example, when an end user customer calls either service provider, the customer service representative (CSR) will see an indication that its service is being delivered to the customer on a shared line. The CSR, using the appropriate script, can then inform the customer of the testing impact on both services and obtain permission to conduct the test in order to isolate and repair the trouble. Since the end user is the customer for both the ILEC voice and the CLEC ADSL service, there is no conflict.

D. Ease of Implementing Work-Around

This is a relatively minor modification to existing customer care processes and procedures. Training of CSRs on the new customer education and scripts represents minor effort. Incorporating of the scripts into the customer care systems is also routine in nature and not major development.

E. Longer Term Solution

The second part to the metallic testing issue is more complex and involves how best to assure testing access to both service providers in the emerging standard reference configuration. In CLEC-ILEC ADSL Line Sharing, the DSLAM will likely be owned by the CLEC and reside in its co-location space in the ILEC end office or at its remote central office. A splitter will be required in the loop configuration to isolate the two services, sending the voice service to the ILEC voice switch and the ADSL service to the CLEC DSLAM. The splitter will likely be located between the MDF and other central office equipment. The ILEC retains testing access to the voice frequencies on the metallic loop through the voice switch. However, the CLEC only has access to the higher ADSL frequencies at its DSLAM, which is unacceptable for metallic loop testing because the voice frequencies have been split off and sent to the ILEC. So the issue becomes how best to provide metallic loop testing access to CLECs in an ILEC-CLEC ADSL Line Sharing situation. The ability to perform metallic loop tests is a key industry installation, maintenance and repair tool used today by both ILECs and CLECs on the lower frequency band of loops being used for xDSL services, in shared and non-shared ILEC and CLEC offerings, and it requires physical access.

CLECs already have invested in automated industry-standard testing capabilities associated with their OSSs supporting xDSL and other offerings today. Such testing capabilities will maintain a basic capability in CLEC-ILEC Line Sharing that is comparable to that used in ILEC-ILEC Line Sharing. To preserve that capability for CLECs, there are three basic requirements that future physical testing access for the voice frequency band must meet as a minimum. First, the access should be on the loop side of the splitter so that the CLEC has access to the full frequency spectrum for comprehensive metallic loop testing. Secondly, the access should be of a type that is suitable for integration into CLEC OSS applications. And thirdly, testing access should be

available at any ILEC end office where co-location services are provided to CLECs and/or CLEC-ILEC line sharing occurs.

F. Ease of Implementing the Longer Term Solution

Testing access could be provided in one of several ways and the level of effort may vary depending on the method chosen. Assume for this discussion that the splitter is located between the MDF and other central office equipment and controlled by the ILEC. ILECs could provide physical test access points to the CLECs in one of at least three methods. First, physical access to the test point at the splitter could be provided to the CLEC for cross-connection back to its co-location space for integration with its testing system and OSS. Secondly, the CLEC OSS could interact directly with an ILEC testing OSS over a standard interface with appropriate security controls to gain physical testing access. Thirdly, the CLEC could forward testing requests to the ILEC for processing by the ILEC.

The first option is efficient from both the CLEC and ILEC OSS perspective in that each service provider has direct access and uses its own OSS. The second option could also be accomplished on an efficient basis by creative use of a test access server that could be shared by multiple CLECs and again, accessed by their OSSs using appropriate security controls. The testing server could be owned and maintained by either the ILEC or the CLECs. The third option is the less desirable, less efficient and less non-discriminatory in that it is indirect and subject to delay, queuing and costly manual intervention by either the CLEC or ILEC.

Once physical testing access is made available, CLEC OSSs associated with pre-ordering, ordering, provisioning, repair and maintenance on shared lines can access the loop for metallic testing purposes as required. The ILEC retains its access via the voice switch or via the testing access point at the splitter.

The level of effort related to ILEC OSS in this area is low. Process and procedure efforts are medium once the splitter and physical testing access is available and depends on the option selected.

ILEC Concern 6: Creation of Duplicate Trouble Tickets

A. Sample ILEC Concern(s)

U S West[39] indicates that service providers "would need to develop new processes to avoid the issuance of two repair tickets for a single problem".

B. Analysis of Underlying Issue

Today in a typical non-Line Sharing situation, the CLEC or its ISP partner/customer is responsible for customer service to the end user and trouble management when an xDSL customer served by a CLEC using a UNE loop from the ILEC experiences a service difficulty. If the CLEC or ISP determines that there is a problem on the UNE loop, the CLEC opens a trouble ticket with the ILEC and the two (or three in the case of an ISP) entities cooperate to restore the end user's loop and advanced service. In a Line Sharing environment, the same would be true.

[39] U S West 7/22/99 at p. 26

After all, the ISP is the CLEC's customer, the CLEC is the ILEC's customer and the end user is a customer of all three.

C. Existing Solution to Concern

If the problem encountered in a Line Sharing environment appears to primarily impact the ADSL service, then the end user should continue to call the ISP or CLEC depending on the customer service ownership. If the problem primarily impacts the voice service, the end user should call the ILEC. If both services are impaired and the end user elects to call either the ISP, CLEC or the ILEC, the recipient of the call should coordinate with the other service provider(s) in accordance with existing procedures. Each service provider has a responsibility to educate the end user in which service provider should be called for problems with their respective service offerings.

D. Ease of Implementing Solution

Since an end user is likely to call only one of the service providers to initiate repair on a shared line rather than calling both, the number of trouble tickets may actually be less than in a non-CLEC-ILEC Line Sharing environment in situations such as cable cuts. This is because if the CLEC was using a separate UNE line to provide service, the end user would likely call in two trouble tickets, one for the voice-only loop and one for the DSL-only loop. If anything, this minor reduction in tickets might have a positive impact on the OSS demand for storage capacity and system resources. However, it is more likely that there would be no substantial difference in the volume of trouble tickets handled by an ILEC OSS in Line Sharing versus UNE scenarios.

In addition, current ILEC trouble management OSSs have existing capabilities to analyze and correlate multiple related trouble tickets. When related trouble tickets occur, the system creates a master trouble ticket and associates the duplicate tickets with the master in a parent/child relationship. Some systems also analyze the various related trouble conditions to assist in pinpointing the problem and isolating the fault for repair.

New ILEC OSS functionality, storage or system resources do not appear to be required, even if there was an unlikely negligible change in trouble ticket volumes. This ILEC concern may be more associated with a falsely perceived potential impact on service indices such as troubles per line, rather than concern regarding OSS impacts.

ILEC Concern 7: Repair and Maintenance

A. Sample ILEC Concern (s)

BellSouth[40] states "If a loop's spectrum is unbundled and separate, distinct services ride that same copper pair, BellSouth is uncertain how ownership will be established for trouble isolation and maintenance of the individual services, or both, that exists on that pair."

Bell Atlantic[41] indicates "...the operation by CLECs of DSL systems on ILEC loops providing ILEC voice services will create some significant operational problems, particularly in the areas of testing and repair. ...Diagnosis and testing of a service with problems will require actions

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[40] BellSouth 6/15/99 filing at p. 24

[41] Bell Atlantic 6/15/99 filing at II- B-10 & 11

outside the capabilities of any single firm. ...There may also be finger-pointing problems in this situation in which each organization asserts that the problem is due to the actions of the other organization."

SBC[42] indicates "Trouble resolution and testing will become more complicated. Today, ILECs have the capability to test the technologies they deploy, but may not have the testing equipment or the training to test all of the technologies that the CLECs wish to deploy. Trouble resolution will also be delayed by the need to notify another carrier that its service may be affected while repairs are made. Trouble resolution will no doubt be further delayed by disputes among carriers on exactly whose service or facility is causing the problem."

U S West[43] states " ...U S West would need to redesign repair and maintenance systems because current systems do not allow two providers to serve a single facility...U S West would need new processes to manage trouble tickets in a single repair flow. There are currently two repair flows: "POTS" and "design" services, and CLECs as a group presently can be assigned only to one or the other."

B. Analysis of the Underlying Issue

The above issues raised in the ILEC filings point toward an umbrella issue that is summarized as: *Line Sharing will create new procedures and added functionality requirements for ILEC OSS.* To analyze the merits of these claims, it is necessary to look at the various scenarios involved in customer service, troubleshooting and repair that exist today and how those might change in a CLEC-ILEC Line Sharing environment. Table 4 summarizes these scenarios so that we can address the differences.

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[42] SBC 6/15/99 filing at p. 23-24

[43] U S West 7/22/99 filing at p. 26

Table 4 - Customer Service and Trouble Management Scenarios

Scenario	Customer Service Responsibility	Trouble Management Flow	Status
1. ILEC-ILEC Line Sharing no ISP involved and end user has either a voice or data problem	ILEC	End user calls ILEC and ILEC repairs	Existing
2. ILEC-ILEC Line Sharing with ISP partner and end user has a data problem	ISP	End user calls ISP, ISP investigates and calls ILEC if required, ILEC repairs and coordinates with ISP, ISP coordinates with end user customer	Existing
3. ILEC-ILEC Line Sharing with ISP partner and end user has a voice problem	ILEC	End user call ILEC, which investigates and repairs	Existing
4. CLEC provides xDSL on UNE loop with ISP involved	ISP	End user calls ISP, ISP investigates and calls CLEC if required, CLEC investigates and repairs or refers to ILEC if required and ILEC repairs	Existing
5. CLEC provides xDSL on UNE loop without ISP involved	CLEC	End user calls CLEC which investigates and repairs or calls ILEC if required and ILEC repairs	Existing
6. CLEC provides ADSL on shared loop with ISP involved and end user has data problem	ISP	End user calls ISP which investigates and calls CLEC if required, CLEC investigates and repairs or calls ILEC if required and ILEC repairs	New
7. CLEC provides ADSL on shared loop without ISP involved and end user has data problem	CLEC	End user calls CLEC which investigates and repairs or calls ILEC if required and ILEC repairs	New
8. CLEC provides ADSL on shared loop with or without ISP involved and end user has voice problem	ILEC	End user calls ILEC which investigates and repairs, ILEC coordinates with CLEC if required	New

C. Existing Solutions to Concern (s)

Scenarios 1 through 5 exist today and are supported by existing ILEC OSS functionality, processes and procedures. Although Scenarios 6 through 8 represent new scenarios associated with CLEC-ILEC Line Sharing, they closely resemble existing scenarios that can be implemented quickly and cheaply.

For example, Scenario 6 resembles existing Scenarios 2 and 4 in that the ISP has primary customer service responsibility and will initiate the involvement of the CLEC and ILEC as required and therefore no new ILEC involvement needed; i.e. quick and cheap to implement.

Scenario 7 resembles existing Scenarios 2 and 5 in that the ILEC does not have primary responsibility for customer service but receives a request to investigate and repair from its partner ISP or its CLEC customer. This requires minimal new ILEC involvement and is quick and cheap to implement.

New scenario 8 resembles existing scenario 1 and 3 in that voice problems are encountered by an end user on a shared line, thus quick and cheap to implement.

Since the new scenarios strongly resemble elements of the existing scenarios, the ILECs could focus on these similarities and modify their existing processes to accommodate the differences. In doing so, most of the differences will be addressed using the existing OSS functionality, either in similar ways, or in slightly different ways such as described in our discussion of Concern 1 on ordering; Concern 2 on two services on one loop; Concern 3 on two customers/service providers on one loop and Concern 8 on billing and customer records. Concern 1 can be addressed by extending existing UNE ordering processes to Line Sharing with minor form modifications. Concern 2 can be addressed by using existing capabilities used for DAML, UDC and ILEC DSL with additional code assignments where necessary. Concern 3 can be addressed by using existing capabilities, assigning new equipment codes and perhaps adding a new field to existing systems. Concern 8 can be handled by assigning new USOCs and using existing billing capabilities. Work-arounds of these remedies are relatively minor in nature and can be done immediately with 2 to 4 weeks required for implementation and ILEC staff training. The few incremental changes, primarily for ordering can be formalized in less than 12 months. For further details, see the specific concerns previously discussed.

The appropriate processes and procedures between CLECs and ILECs in a Line Sharing scenario could be collaboratively revised using existing processes and procedures as the basis[44]. Issues such as whether a service provider has an obligation to notify a customer before tests impacting both voice and ADSL services are conducted, the potential for finger pointing, contact information and complementary customer services scripts could also be addressed during the collaborative session. Agreements could be reached on when and how regular maintenance processes should be conducted on a shared line. Neither of these tasks are significantly different than the type of coordination that is done all the time between service providers that provide only a part of the network and not all of the end-to-end facilities.

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[44] Affidavit of Stuart Miller on behalf of Bell Atlantic- Massachusetts to the Department of Telecommunications and Energy at pages 21-24 describes some of these existing maintenance and repair procedures.

A continuing consideration during these activities must be that the end user customer has chosen to have two service providers and two services on one line. It is reasonable for the end user to expect that the service providers will work together to develop procedures and practices that are in the best interest of the end user. Development of procedures that satisfy this objective should not be difficult to do.

D. Ease of Implementing Work-Around

As Table 4 indicates, there is a strong set of existing ILEC OSS functionality, processes and procedures that can be used as a basis for supporting customer service, repair and maintenance in a CLEC-ILEC Line Sharing environment. The ILEC claims such as that of U S West that it would have to redesign repair and maintenance systems in total appear to be excessive.

ILEC Concern 8: Billing Both Data and Voice Customers On a Shared Loop

A. Sample ILEC Concern (s)

The ILECs expressed several levels of concern regarding the billing on shared lines ranging from no emphasis at all to identifying it as a major problem. For example, Ameritech does not specifically address billing as a Line Sharing OSS issue. Bell Atlantic[45] indicates that "ILEC operations support systems (OSSs) do not have the capability to store information regarding the loop by multiple carriers. Yet clearly such information is needed for ... billing."

U S West[46] indicates that "Incumbent LECs would have to engage in major overhauls of billing systems as a result of a line-sharing requirement. U S West would be required to redesign and rewrite all of its billing systems, at enormous expense, to deal with the fact that two customers would be associated with a single loop. For example, U S West's billing system includes no billing code for an unbundled 'data functionality' ".

B. Analysis of Underlying Issue

ILECs obviously need to be able to accurately bill both their POTS customer for voice service and their CLEC customer for service that the ILEC provides them on the shared loop. Based on the capability currently present in the ILEC billing systems, billing systems are likely to be little impacted by line sharing. This is because the ILECs have added significant flexibility to their systems over the last several years to accommodate their own expanded product and service lines as well as to meet industry and regulatory requirements. These expanded capabilities include the ability to provide billing services for not only their own customers, but also to provide billing services for other service providers. In most cases, they have entirely replaced the old legacy billing systems with newer more flexible systems.

U S West's statement of concern is internally inconsistent to the point of lacking credibility. The statement "U S West would be required to redesign and rewrite all of its billing systems" is not at all supported by the immediately following statement "For example, U S West's billing system includes no billing code for an unbundled 'data functionality' ". Adding a billing code is an

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[45] Bell Atlantic 6/15/99 filing at III-B-14

[46] U S West 7/22/99 filing at p. 26

effort that is orders of magnitude smaller than "redesign and rewrite all of its billing systems". It is a matter of days or weeks to establish the code using existing resources on a part-time basis. By use of this example, U S West quite effectively counters its own argument, rather than supporting it.

C. Proposed Immediate Work-Around

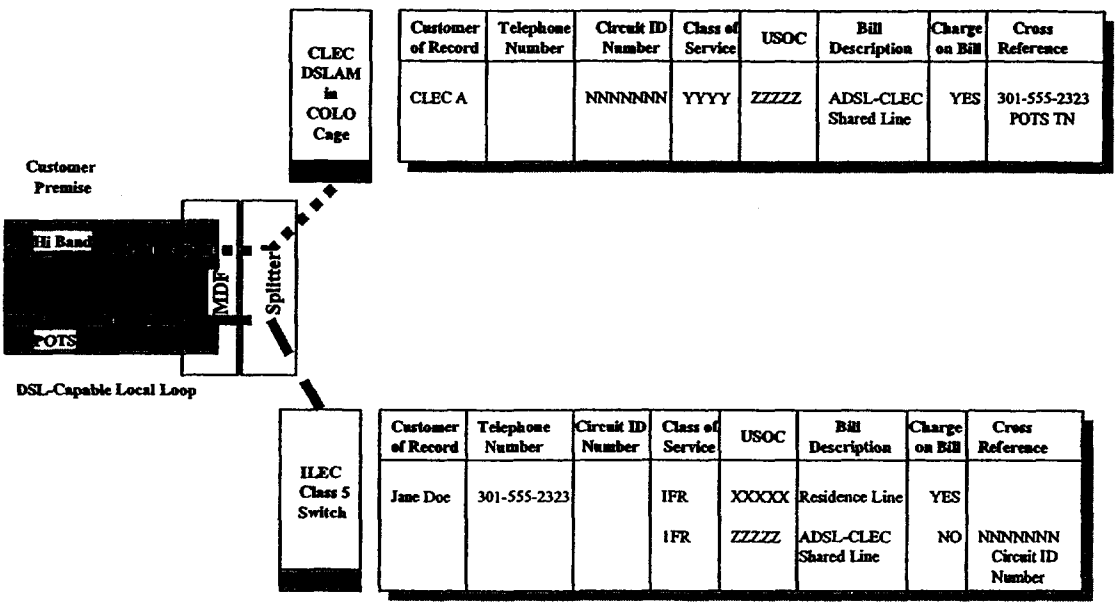
Most ILEC billing systems in use today use a combination of Classes of Service and USOCs coupled with field identifiers (FIDs) and logical rules to associate a customer of record (COR) and the products and services for which the COR should be billed. This functionality could be utilized to handle the billing of shared loops. For example, the approach demonstrated in Figure 1 and described below, or something quite similar, is feasible using the existing capability of a typical ILEC billing system.

In Figure 1, on the following page, the POTS customer's bill data associates the COR with the telephone number (TN). The combination of 1FR class of service and the ZZZZZ USOC for an ADSL CLEC Shared Line results in no charge to the customer for ADSL. However, the customer record and bill are flagged to show a CLEC provides ADSL on a shared line basis and the record is cross-referenced to the CLEC circuit number.

On the ILEC's bill data for its CLEC customer, the combination of class of service YYYY for an wholesale shared loop and the same USOC ZZZZZ for an ADSL CLEC shared loop results in a charge to the CLEC for the shared loop. The shared loop is identified by its circuit number, with a cross-reference to the POTS customer TN.

As the service order moves through processing, the information identifying the two CORs on the shared line can be propagated into other systems as required. When the new order completes, a double posting process can update both customer records with the ADSL shared line indication and cross-reference the TN and Circuit ID. Then as the customer's billing cycle runs, the above combinations of class of service and USOCs will result in proper billing of both the POTS and CLEC customers by the ILEC.

Figure 1 - Billing In A Shared Loop Environment



D. Ease of Implementing Work-Around

Modifications to support this approach include the assignment of additional classes of service and USOCs, used of programmable logic for billing the combinations, and the double posting functionality. The required double posting function is similar to what is done by an ILEC today when a POTS customer changes local service providers. In both cases, the CLEC sends in an order to the ILEC, which must be reflected on two accounts. The ILEC disconnects the service from the POTS COR and establishes a new account and service for the CLEC. These modifications to support line shared ADSL are relatively minor compared to the "major overhauls" alluded to by U S West and are available in some ILEC billing systems today. That availability may be why most ILECs did not identify major billing issues related to Line Sharing in their filings.

There may be variations to this approach required when different billing systems are used by the ILECs for billing wholesale and retail customers, however, the principle remains the same.

C. Flow-Through Provisioning

One of the underlying issues that runs between the lines throughout the ILEC filings is the issue of flow-through provisioning. Both CLECs and ILECs are working toward flow-through provisioning so that all orders can be exchanged electronically and processed automatically with little or no manual intervention in the provisioning activities. Bell Atlantic indicates in its 271 filing with the Massachusetts Department of Telecommunications and Energy that "During the first quarter of 1999, more than 60% of the resale orders flowed through the system each month." [47] However, ILECs are not able to process their own ADSL orders using flow-through provisioning and instead have to manually handle each order at several stages.

The ILECs' apparent reluctance to support CLEC-ILEC Line Sharing, and attempts to use OSS deficiencies as the reason, may center on their desire to maximize flow-through provisioning. Since they would likely have to use a process for CLEC-ILEC Line Sharing orders that is very similar to the non-flow-through provisioning they do for themselves; they may want to avoid doing it.

CLECs and end user customers should not be prevented from benefiting from CLEC-ILEC Line Sharing because the ILECs have failed to upgrade their systems to handle their own products and services. If the ILEC has to process CLEC-ILEC Line Sharing orders with manual intervention, like they do for themselves, until the OSSs are upgraded to meet ILEC needs, then so be it. In fact, implementation of CLEC-ILEC Line Sharing will provide added incentive to make the upgrades and realize the productivity increases associated with moving to flow-through provisioning for all orders.

D. SBC's White Paper Filing of "Telcordia's Proposed OSS Solution for SBC Line-Sharing"

On September 23, 1999, SBC made a written Ex Parte presentation filing[48] to the FCC which contained a four page white paper entitled *Telcordia's Proposed OSS Solution for SBC Line-Sharing Needs*. SBC indicates in its transmittal cover letter that this document "describes the affected OSS's as well as a brief explanation of the modifications to the affected OSS's necessary to manage "Service Activation" and "Service Assurance" in a line-sharing environment."

MTG's review of this document found that it is not a typical white paper in that it is a very high-level overview with few details and little or no specifics on the proposed increases in functionality or level of effort to substantiate either the requirements or the timeline. Nonetheless, we believe that we can usefully comment on it.

Telcordia indicates that enhancements to five OSS are required to support SBC's line sharing needs in a flow-through environment. The systems identified are the Service Order Control System, the Loop Inventory and Assignment System, the Switch Inventory and Assignment System, the Services Database system and the Work Force Management System. MTG believes these system titles, although variant, refer to the SOAC, LFACS, SWITCH, NSDB and WFAC

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[47] Stuart Miller Affidavit dated 5/17/99 p. 16 at 31

[48] Lincoln E. Brown letter to Magalie Roman Salas regarding CC Docket No. 98-147, 9/23/99

systems offered by Telcordia and previously discussed in this section. Examples of the enhancements identified in the document (on page 3) include;

- "New line assignable service identifiers that will uniquely identify the line sharing"
- "New database field to identify the data CLEC that is supplying the data portion of the service"
- "New service identifiers that will be used to identify an unbundled indicator which in turn will differentiate configurations"
- "...the meet point ...will be recognized ...and sent to the appropriate assigning systems..."

The document goes on to say that the solution will be delivered "around the end of 2000", or approximately 15 months from now.

The descriptions of the above examples and the few others in the document are relatively vague and do not provide sufficient information to clearly understand what is really meant.

However, if our interpretation of the limited description is correct, some or all of the enhancements are required by SBC to support its own ILEC-ILEC line sharing requirements and those of its SBC/Ameritech merger commitments. The merger commitments require SBC to treat its arm's-length advanced services subsidiary and other CLECs non-discriminatorily. That said, the enhancements proposed by Telcordia are not driven solely by CLEC-ILEC line sharing and are designed to improve SBC's current service provisioning processes to make them more flow-through in nature.

Further, to the extent we understand the proposed enhancements, we believe that the immediate work-arounds we have proposed previously in this section are complementary with the enhancements described by Telcordia . The Telcordia solution appears to merely be a more "elegant" version of our work-around approach. The biggest difference is that our approach can be implemented immediately while they claim that their approach will take 15 months. The planned enhancements sound similar in nature to the work that Telcordia did for Bell Atlantic's upgrades for its own line sharing services. As such, the need for 15 months of work to deliver similar enhancements, seems excessive.

In short, although there is not enough detail in the white paper to provide a thorough analysis, it appears that SBC needs this type of upgrade for its own requirements and the enhancements are complementary with our recommended work-arounds. The Telcordia/SBC filing in no meaningful way alters our findings and recommendations.